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HOLDING THE LINE

*Forests and
Pesticides*

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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
PA-593 JULY 1963



F-446374

Dead ponderosa pines on the Plumas National Forest in California stand as stark symbols of uncontrolled insect attacks on the Nation's timber.

HOLDING THE LINE—1963

Forests and Pesticides

THE NEVER-ENDING BATTLE

Fighting forest insects and diseases may be likened to a defensive war against a seemingly invincible enemy. The area of invasion is wide, the attacking number countless, and the resources at stake are too valuable to lose. The means of curbing the inroads of these forest destroyers are many and varied. Those involving the use of pesticides sometimes hurt creatures not directly involved in the conflict. Nevertheless, a continuing fight against forest pests is necessary if our Nation is to protect its timberlands and meet its needs for timber, water, forage, wildlife, and recreation now and in the future.

Enemy Damage Is Great

In an average year, insects and diseases kill about 1.8 billion cubic feet of wood. In addition, they slow down the growth on trees not killed by 5.1 billion cubic feet. They have wiped out the American chestnut, threaten white pine stands, and are killing or damaging spruce, pine, fir, and other valuable tree species on millions of acres of forest lands throughout the country.

Weapons Are Becoming Safer

The weapons at man's disposal to fight these forest pests are the best that scientists have so far developed. Not all are perfect, nor do some



F-462693

A crew of insect-and-disease fighters leaving for a counterattacking operation to stem the rapid spread of a forest pest.

represent the ultimate in overall safety. Each year, however, brings new developments, new pesticidal formulations, and new processes that carry fewer risks to men and woodland creatures in connection with such main targets as the spruce budworm, the hemlock looper, pine bark beetles, and white pine blister rust.

Forest Service Battle Experience

The Forest Service of the U.S. Department of Agriculture has for years been actively engaged in campaigns of counterattack against destructive insects and diseases. One of its weapons has been the use of airplanes in chemical spraying operations. Aerial spraying has proved highly effective in suppressing forest insect epidemics. In a few cases, pesticidal chemicals have been detrimental to fish. In all cases, however, harmful side effects have been of a temporary nature. Fish can and do

replenish their numbers in a relatively short time; it takes more than a human generation before healthy trees can take the place of a forest killed by defoliating insects.

The Public Has a Right To Know

The public is rightly concerned about the hazards posed by aerial spraying in our forests. It has a right to know about the effects of such pesticides on living organisms, including human beings. It should also be informed about the precautions that are taken to reduce hazards and of the benefits that have accrued as a result of man's suppressive measures. Since the virtues and faults of pesticides are very much in the news today, the times call for a balanced outlook on the whole question.

Benefits and Risks Studied

President Kennedy's Science Advisory Committee recently prepared a report dealing with the benefits and dangers in the use of pesticides. In it, the contributions of pesticides to the economy of the Nation and to the individual's well-being are clearly set forth. The wealth of our agricultural

produce, for one thing, has been largely dependent on the use of pesticides to cut down on food losses attributable to insects and diseases. The Committee sanctions the continued use of pesticides to combat pests of man and animals, and to protect our food and fiber, but couples this with recommendations for more research into their long-range effects on the environment, more emphasis on biological controls, stricter regulation of pesticide use, and better registration measures with regard to new marketable insecticides.

The additional studies and safeguards will further reduce harmful effects arising from aerial spraying or other chemical uses. Commenting on the Committee's findings and recommendations, Secretary of Agriculture Orville L. Freeman said, "The report makes it clear that pesticides play an essential role in modern agriculture and that with proper controls they can safely be used to protect our food, fiber, and forest crops from the ravages of insect and disease destroyers."

F-482283

Right down the line with a dose of spray that will effectively check the tree-destroying activities of the spruce budworm in this valuable timber stand.



HOW EFFECTIVE IS SPRAYING?

An Average Year—1962

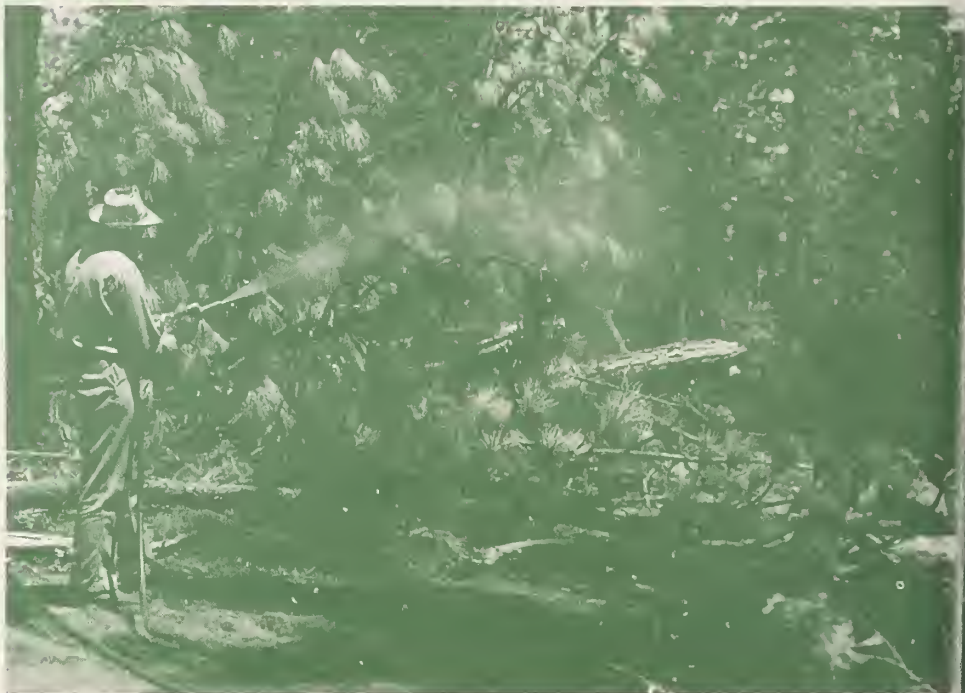
The effectiveness of aerial spraying can best be shown in the accomplishments during an average year. In 1962, projects were carried out in 11 States and involved 7 different forest insects. The average size of the unit treated was 14,196 acres.

The largest project was directed against the spruce budworm. Over 6 million acres of forest land were surveyed in Colorado, New Mexico, Minnesota, Montana, and Wyoming to determine which areas contained high concentrations of this pest. Detection pinpointed over 1 million acres where the insect was epidemic and wholesale tree killing was imminent. In 1962, aerial sprayers converged on these selected spots. Helicopters dropped one-half



F-494229

The spruce budworm, one of the most devastating of forest killers.



F-476891

Spraying ponderosa pine slash on the Shasta National Forest in California to prevent breeding of the California five-spined ips beetle.

pound of DDT per acre close to but away from water courses and critical areas; fixed-wing planes dropped 1 pound of DDT per acre in upland forest areas. The cost varied from \$0.66 to \$1.66 per acre. As a result of the spraying, budworm populations were reduced by 90 to 99 percent.

Epidemics Are Knocked Out

The same degree of effectiveness was achieved in suppression actions on 27,000 acres in Michigan and Minnesota against the jack pine budworm, and on 26,000 acres in Minnesota and Wisconsin against the pine tussock moth, and 33,000 acres in Oregon against the hemlock looper. In these infested areas, too, aerial spraying with DDT was used to achieve beneficial results for the standing timber. In most cases, the epidemics were knocked out with a single application of the chemical.

The fish in a New Mexico pond were killed when a pilot flew off course while spraying, and some trout were killed in a Montana spray block when ground-air communications failed temporarily. Reports of other fish and game kills in various sections proved, on thorough investigation, to be without foundation.

Planning a Project

Before any insect or disease control program is started on the National Forests, the Forest Service carefully studies and evaluates the local situation. First it determines the probable extent of damage to the forest and the control method to use in case expert opinion predicts a high loss of trees. Then it assesses the probable economic loss involved if the epidemic is allowed to continue, as against the cost of bringing the epidemic under control. After

careful consideration, and only after experts have concluded that the benefits will exceed the cost, that effective control can be attained, and that proper safeguards can be set up to minimize side effects, is a pest control project planned.

Proposed Actions Are Reviewed

Forest Service proposals are first reviewed by Federal and State forestry officials, Federal and State health agencies, wildlife biologists, and affected regional groups. They are also reviewed by regional Forest Pest Action Councils, advisory bodies that carry the weight of group opinion. After a project is approved by the aforementioned groups, it is submitted to the Washington office of the Forest Service for further evaluation, of broader scope. The final decision to go ahead, following Washington office approval, lies with the Federal Pest Control Review Board, an independent Federal group that must pass on all such projects involving Federal funds.



F-475590

On the Osceola National Forest in Florida, a crew peels and sprays slash pine stumps to kill larvae and pupae of the destructive black turpentine beetle.



An entomologist, a Forest Ranger, plotted course of a spray operation to control an infestation on the Cibola National Forest.

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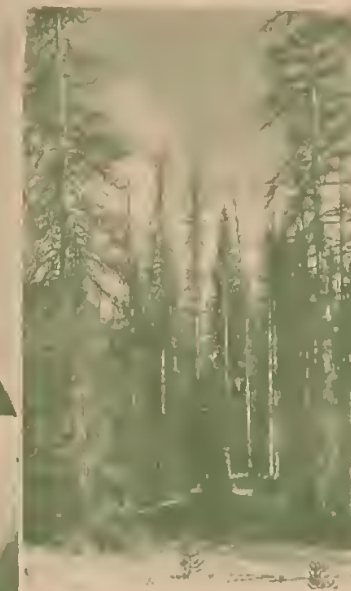
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B-476600
On the Osceola National Forest in Florida, a crew peels and sprays slash pine stumps to kill larvae and pupae of the destructive black turpentine beetle.



F-494371
An entomologist, a Forest Ranger, and a pilot doublecheck the carefully plotted course of a spray operation aimed at knocking out a Tussock moth infestation on the Cibola National Forest in New Mexico.



N-12809
One of the worst beetle infestations in history struck the spruce trees in Colorado, killing over 5 billion board feet of timber.

Precautions Are Taken

Special precautions are used once a control project gets underway, especially when aerial spraying is the weapon used against defoliators. These precautions, in brief, are as follows:

1. Wherever possible, strips along lake shores and large streams are left unsprayed.
2. To protect aquatic life, only part of the area containing major fish-carrying streams is sprayed in any one year.
3. Spray blocks are so laid out as to reduce the drift of pesticide into streams, lakes, pastures, apiaries, or croplands.
4. To prevent overdosing an area, the flow rate of the pesticide is accurately regulated and carefully checked in the spraying aircraft.
5. For the pilot's safety and to prevent any emergency dumping of the insecticide, aircraft are kept in first-class operating condition.
6. Pilots are briefed to avoid certain areas; to avoid overlapping blocks during their spray runs;

and to dump their loads, should an emergency make this absolutely necessary, away from waterways, meadows, and pastures.

7. Fill-in spraying is done accurately and carefully to avoid respraying an already treated area.

8. Advantage is taken of air currents moving away from rather than toward critical areas.

9. During spray operations, aerial observers are constantly on the alert to see that the pilot is following instructions and the precautions outlined above.

10. Included in the precautions are those recommended by the U.S. Fish and Wildlife Service and the State Fish and Game Departments.

Spraying Is Closely Watched

Helicopters are largely replacing fixed-wing planes for better control of spraying drift around sensitive areas, and the amount of pesticide has been reduced in operations near waterways and

meadows. Further, spray pilots are permitted to fly only under certain atmospheric conditions, and the aerial observer may suspend operations at any time he deems it necessary.

The Public Is Informed

Cooperating with the Forest Service are numerous Federal, State, and private agencies that offer advice and assistance to assure the success of these control operations. The general public, especially in an affected area, is properly informed in advance, about an upcoming control project—the reasons why prompt action is necessary, the methods that will be used, the benefits and possible side effects to expect. Backstopping these activities and precautions, the Forest Service operates a continuing research program aimed at devising better, safer, and cheaper means to knock out or slow down the No. 1 tree killers.

MAJOR SUPPRESSION ACTIONS

This Year's Program

Holding strictly to the precautions listed previously, the Forest Service is currently engaged in a number of major insect and disease suppression actions to stem outbreaks that threaten heavy damages to forest values.

The spruce budworm and other leaf-eating insects will be combated on about 1,500,000 acres of forest land, mostly Federal, in Colorado, Georgia, Idaho, Maine, Massachusetts, Minnesota, Montana, New Mexico, North Carolina, Virginia, Washington, and Wisconsin. The hemlock looper and other leaf-eating insects will be treated on 70,000 acres. Control costs range from 5¢ to 10¢ per thousand board feet for trees that have a stumpage value of \$5 to \$15 per thousand board feet. Several different kinds of pesticides will be sprayed from aircraft, including DDT. The amount of this chemical used per acre will vary according to the kind of insect being attacked and the terrain. Half as much will be used around waters, meadows, and other special places as in upland forested areas.



COURTESY OF HILLER AIRCRAFT CORP.

Helicopters are being used for better control of spraying on woodlands bordering waterways, meadows, and other sensitive areas.



F-473522

In the area to be treated, marked by the string, every infested tree is individually sprayed to bring the killer insects under control.

Major Enemies: Bark Beetles

Control of bark beetles on National Forest, State, and private lands, chiefly in the West and South, requires the largest share of pest control funds. These insects are the greatest enemies of coniferous forests, killing about 4½ billion board feet of sawtimber annually. Infested trees run from 5 to 25 or more per acre and each tree is treated individually. Insecticides will be applied to about 1 million trees, 800,000 stumps, and much logging debris that can't be burned before the larvae mature and the beetles emerge. Wherever possible, infested timber is salvaged.

So Are Plantation Insects

Three species of plantation insects, the Saratoga spittlebug, the reproduction weevil, and the white pine weevil are slated for control operations in the Eastern and Lake States and in California. Considerable investments and potentially high harvest values are at stake in this program. About 6,700 acres are involved. Aircraft will drop DDT on the Saratoga spittlebug and the reproduction weevil. Handspraying equipment containing lindane will

be used to spray terminal shoots of individual trees being treated for white pine weevil.

And White Pine Blister Rust

The fight against white pine blister rust disease continues in seven Eastern States, five Lake States, and five Western States. About 22,500 acres of Federal, State, and private lands will be treated with chemicals applied from hand-operated sprayers; 90,000 acres of mountainous forest land (mostly Federal) will be treated with an antibiotic fungicide distributed by helicopter. The careful, supervised application of chemicals in prescribed doses prevents possible plant injury or water pollution. The fungicide shows no adverse effects on fish, wildlife, or people.

And Oak Wilt

Two other disease control projects include a Federal-State cooperative action in the East and South to check the tree-killing oak wilt; and a smaller program to control the spread of *Fomes annosus*, a root disease of coniferous forest plantations. An insignificant amount of chemicals is used in the oak



The Saratoga spittlebug is a serious pest of red pine plantations in Wisconsin and Michigan.



F-499306

Spraying a pine trunk with a fungicide that stops blister rust infection. Antibiotics are a new form of control against this widespread disease.

wilt program to treat about 4,000 trees in an extensive area of oak forests. Coal tar creosote is used in the fight against the root disease.

NOT TO SPRAY MAY BE A GREATER DANGER

A Rational Approach

Secretary Freeman said of chemical pesticides that "they have given us an effective means of protecting our food supplies—and if there are certain dangers attendant upon *using* them, I believe there may be greater dangers in *not* using them." The same applies equally well to our timber resources. Much depends on maintaining an approximate balance between the destructive and creative forces in the forest. Man cannot depend on nature to do this, because environmental changes have somewhat altered the scales. The most potent weapons today are pesticides, and society must make the choice between using them and accepting some possible hazards or not using them, thus endangering vital timber supplies and other forest values.

Research Continues

The issue should be weighed rationally rather than emotionally. For example, information on the long-range effect of chemical residues in the

bodies of living animals or humans remains scanty. We do not know for certain whether they are harmful or not. We must wait for further research findings. In the meantime, the Forest Service, in the interest of the Nation and of the forest resources in its charge, considers it necessary to continue to use pesticides—in the case of DDT with even greater caution because of its persistence.

Health of People and Wildlife Paramount

The Forest Service will also continue to pilot-test nonpersistent chemicals and nonchemical controls in the hope that effective substitutes can be found. And, as more information concerning the qualities of pesticides is gathered by Government and private research agencies, changes will be more readily effected in the use or disuse of certain suppressive agents. The people will continue, as at present, to have every assurance that their own health and the health of other living creatures are accorded paramount importance before any decision is made to use chemicals against these forest destroyers.

F-465765

Judicious use of pesticides to prevent and control outbreaks of insect or disease epidemics contributes significantly to the preservation of our forests' beauty and usefulness.



